

**Navajo Abandoned Mine Lands Reclamation Department**

**CAMERON PROJECT 2**

**TECHNICAL SPECIFICATIONS**

<b>Section 0100</b>	<b>General Information</b>
<b>Section 0200</b>	<b>Mobilization</b>
<b>Section 0300</b>	<b>Scope and Description of Work</b>
<b>Section 0400</b>	<b>Site Specific Details</b>
<b>Section 0500</b>	<b>Maps and Drawings</b>
	<b>Appendix A</b>

**SECTION 0100  
GENERAL INFORMATION**

**PART 1 - GENERAL**

**101.01      WORK DESCRIPTION**

The work described is related to reclamation of fifteen (15) abandoned uranium mine sites near Cameron, Arizona, on the Navajo Nation. The fifteen mine sites are located on the east side of U.S. Highway 89, (see location map) in Townships 28 and 29 North, Range 9, 10 and 11 East, Gila and Salt River Meridian. The work includes: excavating waste pile material; backfilling open pits following a specified sequence so as to meet the guidelines of the Navajo Nation's Abandoned Mine Lands Reclamation Department relating to the level of radioactivity in the soils and radiation emission into the air; regrading of the areas disturbed by construction activities in a manner so as to provide adequate drainage and soil erosion protection; and repairing and cleaning up of 3 existing livestock ponds including a small dike. The total project area is approximately 166 acres. The fifteen sites include: NA-0127, Max Johnson No. 1; NA-0128a,b Lemuel Littleman No. 2; NA-0129, Charles Huskon No. 1; NA-0130, Max Johnson No. 10; NA-0135, Evans Huskon No. 2; NA-0136, Yazzie No. 101; NA-0138, Boyd Tisi No. 2; NA-0139, Juan Horse No. 3; NA-0149a,-b,c,d, Charles Huskon No. 3; Na-0153, Charles Huskon No. 7 and NA-0154, Yazzie No. 102. The sites are to be reclaimed in the following order;

- 1) NA-0130,      Max Johnson No. 10.
- 2) NA-0127,      Max Johnson No. 1
- 3) NA-0128A,      Lemuel Littleman No. 2
- 4) NA-0128B,      Lemuel Littleman No. 2
- 5) NA-0129,      Charles Huskon No. 1
- 6) NA-0136,      Yazzie No.101
- 7) NA-0135,      Evans Huskon No. 2
- 8) NA-0138,      Boyd Tisi No. 2
- \* 9) NA-0139,      Juan Horse No. 3
- 10) NA-0149D,      Charles Huskon No. 3
- 11) NA-0149C,      Charles Huskon No. 3
- 12) NA-0149B,      Charles Huskon No. 3
- 13) NA-0149A,      Charles Huskon No. 3
- 14) NA-0153,      Charles Huskon No. 7
- \* 15) NA-0154,      Yazzie No. 102

\* includes rehabilitation of nearby livestock ponds.

101.02      SCOPE OF WORK

A.    General:    The principal items of the WORK include:

1)    Mobilization

2)    Earthwork:

- a.    dust control and provision of health and safety protection measures.
- b.    waste pile excavation and backfilling the open-pits with the excavated material in accordance with the specified backfilling sequence.
- c.    construction of replacement water catchment areas: repair of broken earth dikes and cleaning up of silted livestock ponds for water retention.
- d.    regrading the reclaimed areas to specified contours as per the Technical Specifications and/or the direction of the Project Representative or the Engineer, and in a manner as to provide adequate drainage around and off the reclaimed areas. The CONTRACTOR shall bring backfill to the grade shown on the Drawings or to blend with the surrounding natural contours. Backfill material shall be free of voids and shall be compacted with the weight of the earth moving machineries during normal operations.
- e.    placement of soil cover at certain portions of the reclaimed areas designated by the OWNER, if needed, to reduce the radiation emission.

B.    The work required at each site is more clearly detailed in Section 0400, Site Specific Details.

C.    Volume calculations shown in these Technical Specifications and bid summary sheets are estimates only and it is expressly declared that the Navajo Abandoned Mine Land Reclamation Department does not guarantee the accuracy of the information or that the level of work encountered is the same in character, location and elevation as shown on the maps and drawings. It shall be the responsibility of the bidder to make such investigations and calculations as bidder deems necessary to determine the work required.

D.    The WORK to be accomplished under this contract will require close coordination and cooperation with the PROJECT COORDINATOR. The professional engineer of the Navajo AML Reclamation

Department will have the final authority as to all technical matters on behalf of Owner.

#### **101.03 SUBMITTALS**

- A. Submittals requested in the Technical Specifications shall be delivered to the designated PROJECT COORDINATOR at the Navajo Abandoned Mine Lands Reclamation Department, Tuba City Field Office, P. O. Box 730, Tuba City, Arizona or to the Tuba City AML Field Office located in the fenced-in, double-wide mobile home near the Navajo Trails Mall Professional Offices, Junction of Highway 160 and Highway 264, Tuba City, Arizona.
- B. CONTRACTOR shall submit within ten (10) days after execution of the CONTRACT, a schedule of work for the performance of the WORK, including routine workdays and hours, holidays observed by the Navajo Nation, and days that the project will remain idle. The schedule shall also indicate WORK schedules for subcontractors and their estimated start and completion days. Allowance in the schedule shall be made for routine delays due to weather or other site conditions as they occur. The PROJECT COORDINATOR shall approve said schedule. Any significant deviation from the schedule shall be submitted in writing to the PROJECT COORDINATOR in the form of an updated schedule as the WORK progresses. The CONTRACT TIME for this project is 210 calendar days.
- C. The Project Superintendent shall submit to the PROJECT COORDINATOR daily logs indicating the following: 1) weather conditions, 2) equipment used, 3) WORK completed, including cubic yards moved, 4) delays, 5) equipment downtime, 6) volume of water use for dust suppression, 7) injuries, 8) visitors, and 9) concerns and recommendations. The PROJECT COORDINATOR will provide a form for these logs. The selected Bidder shall submit a construction safety and health feasibility monitoring program before the award of the contract.

#### **101.04 CONDITIONS AND RESTRICTIONS**

- A. WORK shall be performed in accordance with mitigation recommendations outlined in "Recommendations for the Protection of Paleontological Resources During Mine Reclamation" stated in Appendix A.
- B. WORK shall occur during daylight hours and shall not be performed when darkness or other conditions require the use of artificial light to safely perform the WORK.
- C. WORK shall be conducted with minimum interference to public or private roads. Egress and access shall be maintained at all times.

- D. The Project Superintendent shall identify and develop rapid communication procedures with the closest available emergency medical response units and medical centers. All supervisors/foremen, superintendents/managers shall be indoctrinated to emergency response procedures.
- E. Existing utilities, bench marks, trees, vegetation and landscaping materials near and outside the project boundaries shall be protected.
- F. Employees shall be compensated at a rate of no less than 1.5 times the base rate of pay for work beyond 40 hours in one week.
- G. The WORK shall stop and the PROJECT COORDINATOR notified immediately if an accident occurs or upon discovery of a hazard that threatens the safety of workers or the public. The PROJECT COORDINATOR shall be notified immediately of any situation which may cause environmental damage.
- H. The OWNER shall obtain the permit to use Highway Right-of-Way.
- I. CONTRACTOR shall be responsible for obtaining a Navajo Tribal Water Permit for use in dust abatement. Payments will be the responsibility of the CONTRACTOR.
- J. CONTRACTOR shall be responsible for the worker's safety in the work area which includes, but is not limited to, safety training, first aid provisions, protection from injury and radiation. CONTRACTOR must provide radiation monitoring TLD badges to each person in the project for quarterly monitoring of exposure to low level radiation, the cost of which shall be included in other pay items. The Contractor shall also protect his/her workmen from exposure to dust by providing dust masks and dust proof cabs for equipment and also through watering down of the work site.

#### **101.05      QUALITY ASSURANCE**

CONTRACTOR shall assure that the WORK has been performed to the specifications and standards as described herein. The PROJECT COORDINATOR shall inspect and accept, or reject, the WORK as the WORK progresses.

#### **PART 2 - PRODUCTS**

##### **102.01      GENERAL**

Products and materials used in the WORK shall be as required in these Specifications.

#### **102.02 DELIVER, STORAGE AND HANDLING**

- A. CONTRACTOR shall be responsible for the delivery, storage and handling of all items and materials used in performing the WORK.
- B. CONTRACTOR shall be responsible for all materials used in conjunction with the WORK until said WORK is accepted and approved by the PROJECT COORDINATOR and shall warrant all materials as required by Technical Specifications, SECTION 101.06, Quality Assurance.

#### **PART 3 - EXECUTION**

##### **103.01 EXECUTION**

- A. Upon receipt by the CONTRACTOR of due NOTICE TO PROCEED, the CONTRACTOR shall have Ten (10) days to mobilize equipment to the site. WORK shall commence in accordance with the Technical Specifications and Drawings as presented herein. CONTRACTOR shall provide the PROJECT COORDINATOR with a schedule for the proposed WORK in calendar form.
- B. Prior to commencement of the WORK, CONTRACTOR shall be in compliance with provisions set forth by the Navajo Manpower Law, administered by the Department of Labor, Office of Navajo Labor Relations.
- C. CONTRACTOR shall obtain and provide proof of all licenses, permits, bonds, insurance, and other such items as may be required by these specifications and local, regional, State and Federal jurisdictions prior to execution of the WORK.

#### **PART 4 - MEASUREMENT AND PAYMENT**

##### **104.01 WORK INCLUDED**

- A. The WORK included shall be as described within each Section of the Technical Specifications.
- B. Compensation for the WORK will be based on the UNIT PRICES or the LUMP SUM prices depending on whichever price is selected.

##### **104.02 MEASUREMENT**

For UNIT PRICE projects the measurement for payment for the work shall be on the actual measurement basis as the individual site WORK is completed and approved by the PROJECT COORDINATOR. For LUMP SUM WORK, no work measurement is necessary.

CONTRACTOR may submit an invoice to the PROJECT COORDINATOR upon completion and approval of each site.

**104.03      PAYMENT**

- A. Payments shall only be made for those items shown on the BID SCHEDULE. All other costs of incidentals shall be reflected in the BID SCHEDULE or shall be paid at the CONTRACTOR's expense.
- B. Payment for bid items shall be based on the actual measured quantities and the corresponding UNIT PRICES of the work items completed at each site or on a LUMP SUM basis as applicable.
- C. Additional quantities for bid items shall be paid at the BID UNIT PRICE after a Change Order is executed and made part of the CONTRACT. Proof of additional quantities will be required from CONTRACTOR prior to payment. The BID UNIT PRICE will include all costs incurred for the ADDITIONAL WORK, and shall be the only compensation for such ADDITIONAL WORK. Change Order(s) may also be negotiated on a LUMP SUM basis.
- D. All invoices for progressive payment shall be submitted by the CONTRACTOR on a monthly basis or upon completion of a specific site in conjunction with General Conditions, 13.A. Retainage of 10% or 20%, which ever is applicable as per General Condition, will be withheld from all progressive payments. Upon satisfactory completion of the CONTRACT WORK and submittal of all project closeout documents, the CONTRACTOR shall submit an invoice for payment on the retainage.

END OF SECTION 0100

**SECTION 0200  
MOBILIZATION**

**PART 1 - GENERAL**

**201.01      WORK INCLUDED**

Mobilization includes, but is not limited to, movement of personnel, equipment, supplies, and incidentals to and from the project area, improvement of access roads, and all other WORK and operations which must be performed prior to the initiation of meaningful work (items of WORK on the BID SCHEDULE) at the site.

**PART 2 - PRODUCTS**

**202.01      DRINKING WATER AND SANITARY FACILITIES**

CONTRACTOR shall provide and maintain safe drinking water and sanitary facilities for all workmen and supervisors at the WORK SITE. The CONTRACTOR shall also provide a temporary office at the WORK SITE.

**PART 3 - EXECUTION**

**203.01      EXECUTION**

Upon receipt by the CONTRACTOR of the NOTICE TO PROCEED, the CONTRACTOR shall have ten (10) days to mobilize equipment to the site and commence the WORK, in accordance with the TECHNICAL SPECIFICATIONS and DRAWINGS as presented herein. CONTRACTOR shall provide the PROJECT COORDINATOR with a schedule for the proposed WORK in calendar form.

**PART 4 - CONDITIONS AND RESTRICTIONS**

**204.01      ACCESS**

- A. Temporary access improvements shall be constructed so as to minimize disturbance to existing vegetation, and to minimize potential erosion. CONTRACTOR shall obtain prior approval from PROJECT COORDINATOR before constructing new access roads.
- B. CONTRACTOR shall minimize disturbance resulting from site access improvements. Existing permanent roads shall be left in condition at least as good prior to the WORK.

PART 5 - MEASUREMENT AND PAYMENT

**205.01      MEASUREMENT**

There will be no separate payment for mobilization (or demobilization for this project). The CONTRACTOR must include this cost in other bid items.

END OF SECTION 0200

**SECTION 0300  
SCOPE AND DESCRIPTION OF WORK**

**PART 1 - GENERAL**

**301.01 WORK INCLUDED**

The principal items of the site earthwork include: 1) Dust control; 2) waste pile excavation and/or collection of waste and protore piles in the vicinity and backfilling the abandoned open pits with these materials so as to grade the reclaimed surface to contours specified in the drawings and to provide drainage around the reclaimed areas; 3) repair and cleaning up of three (3) existing livestock ponds, including a small dike. The work for each site is fully detailed in Section 0500, Specific Site Requirements. Other items of Work include mobilization, demobilization and cleanup, cost of which should be included with other payable Bid items.

**301.02 SUBMITTALS**

CONTRACTOR shall submit with the Bid Proposal a list of equipment to be used to complete this section of the WORK. The equipment shall be inspected and approved by the PROJECT COORDINATOR or the ENGINEER prior to the initiation of the WORK. Equipment cabs shall be dust proof and ventilated (including air conditioning when needed).

**301.03 CONDITIONS AND RESTRICTIONS**

- A. CONTRACTOR shall conduct earthwork in a fashion to minimize erosion during and after construction. This shall include limiting disturbance of existing vegetation, working equipment parallel to contours, use of temporary drainage control where appropriate, and other practices as directed by the PROJECT COORDINATOR or the ENGINEER.
- B. CONTRACTOR shall provide an adequate water supply system for dust control to reduce dust nuisance, and to minimize airborne radionuclides, during all earthwork activities.

**PART 2 - PRODUCTS**

**302.01 MATERIAL DEFINITIONS**

- A. Waste Pile:  
Barren or nearly barren material removed during mining to gain access to the ore zone. A waste pile may contain amounts of mineralization significant for reclaiming purposes and protore piles (low grade ore rejected during mining operations).

**B. Fill Material:**

Excavated waste pile material used for backfilling the open pits. Prior to excavation, the waste pile material will be categorized by the HEALTH PHYSICIST of the Navajo Nation or the PROJECT COORDINATOR into one of the following classes depending upon the degree of radioactivity:

Class 1. Radioactive (low level) Waste pile material and/or protore materials.

Class 2. Waste pile and/or protore material with very minor radioactivity (lower than that of Class 1 materials).

Class 3. Other waste pile material with radiation levels at or near the natural background levels.

To ease earth movement during excavation, backfilling, and grading operations, the PROJECT COORDINATOR will categorize the waste pile materials into classes in such a manner that a particular pile is categorized into a single class, as far as practicable.

**PART 3 - EXECUTION**

**303.01 GENERAL**

The intent of this work is to backfill mine pits with waste-pile material in accordance with the sequence outlined in Section 303.02.B.; to regrade disturbed areas to establish favorable drainage conditions and provide erosion protection; cover radioactive material with suitable material; and to repair and clean up three (3) existing livestock ponds including a small dike.

**303.02 EXECUTION**

**A. Dust Control:**

1. Dust control shall consist of furnishing water supply required equipment, and incidentals, and carrying out proper and efficient measures wherever and as often as necessary to reduce dust nuisance, to prevent dust originating at the loading and unloading points of wastepile or cover material or on the haul road, and to minimize airborne radionuclides resulting from construction operations.
2. Water shall be applied by means of pressure-type distributors or pipe lines equipped with a spray system or hoses with nozzles that will insure a uniform application of

water.

3. Unless otherwise permitted by the OWNER, or unless all the water is applied by means of pipe lines, at minimum one mobile unit with a minimum capacity of 5,000 gallons shall be available in operating condition for applying water on the project site at all times.

B. Excavation and Backfilling Sequence:

1. Class 3 material shall be excavated and placed in the bottom of the pit(s) as a buffer zone. The thickness of the layer will be at the discretion of the PROJECT COORDINATOR depending upon the availability of the Class 3 materials.
2. Class 1 material shall be excavated and placed in the pit(s) on the top of the Class 3 materials.
3. Class 2 material shall be excavated and placed in the pit(s) on the top of the Class 1 materials.
4. Class 3 materials from the waste piles and the replacement pond shall be used to construct the final cover in the pit(s).
5. Lifts of backfill material shall be placed in accordance with Section 303.03, Fill Requirements, and the maps and drawings. The final lift shall be at least three (3) feet thick and shall match the slopes and contours as shown in the specific site map/drawing. The Owner reserves the right to make minor adjustments or revisions in lines or grades, if found necessary, as the construction work progresses, due to minor discrepancies in the map(s) or drawing(s) or to obtain satisfactory reclamation.

C. Repair and cleaning up of existing livestock ponds/dikes:

Repair of the berms and the bank slopes of three (3) existing livestock ponds, including a small dike (see details in Sec. 0400), and the cleaning up of the silted ponds shall be conducted in Accordance with Section 0400. Excess excavated material will be stockpiled on the banks.

D. Regrading:

Regrade all areas specified in the drawings to establish favorable drainage conditions and erosion protection. Regrading is an essential part of the work item "Site Earthwork" and shall comply with the specified contours.

E. Special work item:

A special UNIT PRICE bid item has been set forth in the bid schedule for placement of clean cover material (class 3 material) on reclaimed areas to reduce radiation emission to acceptable limit. This will be necessary only if hot spots are found after reclamation. Under normal circumstances, if the backfilling sequence is strictly followed and enough Class 3 material is available on site, there will be no hot spots on the reclaimed areas. Work under this bid item can be authorized only with the express written permission from the Engineer and/or the Project Coordinator. This item is totally deletable from the Contract Amount without a Change Order, if not used up. Payment under this item shall be made only for the actual amount of work completed and verified by measurement, and only when the radiation emission is reduced to acceptable level (which is not more than the background radiation ground contact measurement in  $\text{pCi/g} + 25 \text{ pCi/g}$  or background measurement at 1 meter height in  $\text{uR/hr} + 50 \text{ uR/hr}$ ).

**303.03 FILL REQUIREMENTS**

Fill material shall be placed in lifts with maximum of three (3) feet thickness, and compacted by the normal weight of the earth moving equipment. Water shall be used as necessary in the backfill operation for dust control.

PART 4 - MEASUREMENT AND PAYMENT

**304.01 MEASUREMENT**

Measurement for excavations shall be accomplished by standard surveying. For Lump Sum Bids measurement of the earthwork may be done by the OWNER solely at its discretion, but is not needed for payment purpose.

**304.02 PAYMENTS**

Payment for Site Earthwork will be made for excavation only on a monthly basis or upon completion of a specific site following successful and acceptable work performance in conjunction with General Conditions, 13.A. Retainage shall apply on progressive payments until the Final Payment as specified in Section 104.03.D.

END OF SECTION 0300

**SECTION 0400  
SITE SPECIFIC DETAILS**

**PART 1 - GENERAL**

**401.01      WORK INCLUDED**

This Section describes the location and features present, and the WORK to be performed at each mine site included in Cameron Abandoned Mine Lands Reclamation Project 2. The items of the WORK at each site will be performed according to the appropriate sections of these Specifications.

**401.02      LOCATIONS AND DESCRIPTIONS**

Descriptions of the fifteen (15) individual mine sites and their locations are presented below. Details and dimensions are shown on the Maps. CONTRACTOR will be aware that the dimensions on the Maps are approximate. CONTRACTOR will also be aware that minimum and maximum dimensions on the Maps given in the Specifications are specific and are to be adhered to unless such changes are approved in writing by the OWNER. The quantities presented in the specific site requirement sections should be considered as an estimate. The CONTRACTOR is required to visit the site and determine the quantities and amounts required in performing the WORK as intended in these Specifications and on the Maps and Drawings.

**PART 2 - EXECUTION**

**402.00      WORK REQUIRED AT ALL SITES**

The following Work shall be performed at each of the fifteen (15) sites in Cameron Abandoned Mine Lands Reclamation Project #2. The CONTRACTOR shall:

1. Mobilize equipment to the site with conditions set forth in Section 0200, Mobilization.
2. Execute excavation and backfilling in accordance with Section 0300, Site Earth Work.
3. Repair and clean up the three (3) existing livestock ponds, including a small dike.
4. Cleanup and remove all refuse and miscellaneous waste generated by reclamation activities.

## **SITE SPECIFIC WORK DETAILS**

Scope of Work outlined below in general is the same for all the project sites:

**WORK - General:** The work entails excavation of wastepile and pro-tore material, backfilling the same in the open pit and regrading all areas disturbed by the work in a manner which will ensure positive drainage around and off the reclaimed area and reduction of the radiation emission to an acceptable level. The work shall be conducted in accordance with all applicable health and safety laws and regulations.

**MAPS & DRAWINGS:** For locations of various work sites and technical details, please refer to Section 0500.

### **402.01: SITE NA-0127, Max Johnson No. 1**

**Location:** Site NA-0127 is located approximately 1.1 miles west of the US highway 89 along unimproved Indian route 6730 on the north side of a hill.

**Description:** This site features an open pit mine with associated waste piles around the open pit. The entire site is estimated to encompass 10.24 acres. Estimated volume of the spoil piles is at 22,776 cubic yards covering 5.35 acres which will be backfilled into the open pit.

The volumes of individual waste piles at this sites are as follows:

WP-1:	7,577 cu. yds.;	WP-2:	5,679 cu. yds.;
WP-3:	1,103 cu. yds.;	WP-4:	7,672 cu. yds.;
WP-5:	472 cu. yds.;	WP-6:	273 cu. yds.

**Site Access:** Site access shall be along Indian route 6730 an unimproved dirt road that leads to the site. The unimproved roads may be upgraded by the CONTRACTOR, if necessary; however during the construction the CONTRACTOR must insure that all traffic will use the same road to keep down vehicular impact to the area. Access roads off route 6730 upon completion of the construction will be taken out by means of a ripper which will be directed by the PROJECT COORDINATOR.

**Site Earth Work:** Earth work shall be in accordance with Section 303.02 B, Excavation and Backfilling Sequence. Final lift shall be in Accordance with Section 303.03 Fill Requirements. The following is the sequence of work;

- a) Improve access to the site;

- b) Improve the access to the pit;
- c) Excavate spoil and place into the pit;
- d) Regrade disturbed areas to a slope of 5h:1v or less.

**402.02: SITE NA-0128a, LEMUEL LITTLEMAN NO. 2**

**Location:** - NA-0128A, Lemuel Littleman No. 2; is located 1.4 miles east of highway 89 and route 6730 junction on the north side of a hill.

**Description:** - This site features an open pit mined area, with associated wastepiles. The estimated volume of waste is 13,282 cubic yards covering 2.17 acres which will be used to backfill the open pit in a selective sequence. Total impacted area is approximately 3.06 acres.

The volumes of individual waste piles at this site are as follows:

WP-1: 5,524 cu. yds.; WP-2: 234 cu. yds.;

WP-3: 7,441 cu. yds. Scattered - 83 cu. yds.

**Site Access:** Access will be along Indian route 6730 and then taking the road leading to the "community landfill". Unimproved roads may have to be improved; However the CONTRACTOR must insure that all construction traffic use this road to lessen impact from vehicular traffic to the land. Any other ancillary roads created must be taken out and blended with existing topography after completion of construction.

**Site Earth Work:** Earth work shall be in accordance with Section 303.02 B, Excavation and Backfilling Sequence. Final lift shall be in Accordance with Section 303.03 Fill Requirements. The following is the sequence of work;

- a) Improve the access to the site;
- b) Improve the access to the pit;
- c) Excavate the spoil and place into the pit;
- d) Regrade disturbed areas to a slope of 5h:1v or less.

**402.03: SITE NA-0128b, LEMUEL LITTLEMAN NO. 2**

**Location:** Site NA-0128b, Lemuel Littleman No. 2 is located 1.7 miles east of the highway 89 and route 6730 junction on the northeast side of the hill.

**Description:** This site features four (4) small open pit mines, with associated wastepiles. The estimated volume of spoil is at about 19,998 cubic yards covering approximately 2.20 acres which will be used to backfill the open pits. The total area of the site is approximately 10.95 acres. The following is a rough breakdown

of the total volume of the wastepiles into individual volumes of the wastepiles WP-1 through WP-5, as shown on the map:

WP-1:	5,300 cu. yds.	WP-2:	1,700 cu. yds.
WP-3:	8,800 cu. yds.	WP-4:	2,800 cu. yds.
WP-5:	598 cu. yds.	Scattered:	800 cu. yds.

**Site Access:** Access to site will be via unimproved roads that lead to the site. The unimproved roads may be improved by the CONTRACTOR if necessary; however, upon completion of site WORK, the roads shall be returned to its original condition or better.

**Site Earth Work:** Earth work shall be in accordance with Section 303.02 B, Excavation and Backfilling Sequence. Final lift shall be in accordance with Section 303.03 Fill Requirements. The following is the sequence of WORK;

- a) Improve access to site;
- b) Improve pit access;
- c) Excavate and place Waste Piles in pit;
- d) Regrade disturbed area to slopes 5h:1v or less.
- e) Place excess waste material in location(s) selected by the PROJECT COORDINATOR in the vicinity, if required.

**402.04: Site NA-0129, CHARLES HUSKON No. 1**

**Location:** Site NA-0129, Charles Huskon No. 1 is located 1.1 miles east of the junction highway 89 and route 6730 on the south slope of a hill.

**Description:** This site features an open pit mine with some benching along the natural hill where the mining took place with associated mine spoils. The estimated spoil volume is about 101,465 cubic yards covering approximately 10.8 acres. The spoil shall be used to backfill an open shallow pit and its associated bench cuts to approximate the existing topography while also addressing drainage control.

The following is a rough estimate of the breakdown of the total volume of the wastepiles into individual volumes of the wastepiles WP-1 through WP-4, as shown on the map:

WP-1:	53,025 cu. yds.	WP-2:	39,620 cu. yds.
WP-3:	2,970 cu. yds.	WP-4:	5,850 cu. yds.

**Site Access:** Access to site will be via unimproved roads that lead to the site. The unimproved roads may be improved by the CONTRACTOR

TOR if necessary; however, upon completion of site WORK, the roads shall be returned to its original condition as possible or better.

**Site Earth Work:** Earth work shall be in accordance with Section 303.02 B, Excavation and Backfilling Sequence. Final lift shall be in Accordance with Section 303.03 Fill Requirements. The following is the sequence of WORK:

- a) Improve access to site;
- b) Improve pit access;
- c) Excavate and place Waste Piles into pits;
- d) Regrade disturbed area to slopes of 4h:1v or less;
- e) Backfill excess waste material at nearby locations selected in the vicinity by the PROJECT COORDINATOR.

**402.05      Site NA-0130, MAX JOHNSON No. 10**

**Location:** Site NA-0130, Max Johnson No. 10 is located 1.2 miles east of highway 89 and route 6730 junction on the south side of a hill.

**Description:** This site features an open dozer pit next to NA-0129 with an estimated volume of spoil at 8,405 cu. yds. (shown as WP-1 in the map) which shall be used to backfill the shallow dozer cut.

**Site Access:** Access to site will be via Indian Route 6730 and unimproved roads that lead to the site. The unimproved roads may be improved if necessary; however, upon completion of site WORK, the roads shall be returned to its original condition by means of a ripper.

**Site Earth Work:** Earth work shall be in accordance with Section 303.02 B, Excavation and Backfilling Sequence. Final lift shall be in Accordance with Section 303.03 Fill Requirements. The following is the sequence of WORK:

- a) Improve access to site;
- b) Improve pit access;
- c) Excavate and place Waste Piles in pit;
- d) Regrade disturbed area to slopes of 4h:1v or less;
- f) Place excess waste material at location approved by the PROJECT COORDINATOR, if required;

**402.06      Site NA-0135, EVANS HUSKON No. 2**

**Location:** Site NA-0135 is located 2.1 miles southeast of the highway 89 and route 6730 junction along the dirt road that leads past the community dump.

**Description:** This site features remnants of an open pit that has been naturally backfilled with runoff from being in a drainage basin. Around this open pit are steep spoil piles which will be used to backfill the depression, while at the same time the steep slopes of the highwall will be eliminated. The total volume of the waste spoil material is estimated to be 6,720 cubic yards. The area of disturbance is approximately 4.56 acres.

The volumes of individual waste piles at this site are as follows:

WP-1:	3,197 cu. yds.;	WP-2:	1,207 cu. yds.
WP-3:	2,074 cu. yds;	Scattered -	242 cu. yds.

**Site Access:** Site access shall be along Indian Route 6730 an unimproved dirt road that leads to the site. The unimproved roads may be upgraded by the CONTRACTOR, if necessary; however, during the construction the CONTRACTOR must insure that all traffic will use the same road to keep down vehicular impact to the area. Access roads off route 6730 upon completion of the construction will be taken out by means of a ripper which will be directed by the PROJECT COORDINATOR.

**Site Earth Work:** Earth work shall be in accordance with Section 303.02 B, Excavation and Backfilling Sequence. Final lift shall be in Accordance with Section 303.03 Fill Requirements. The following is the sequence of work;

- a) Improve access to the site;
- b) Improve the access to the pit;
- c) Excavate spoil and place into the pit.
- d) Regrade disturbed areas to slopes of 5h:1v or less;

#### **402.07 Site N-0136, YAZZIE No. 101**

**Location:** Site Na-0136, is located 2.2 miles southeast of the junction of highway 89 and route 6730 taking the dirt road that leads past the community dump.

**Description:** This site features two shallow pits that have through time have been partial backfilled with a pit wall to the east that has very steep highwalls remaining. The spoil volume is estimated to be 39,262 cubic yards covering approximately 9.24 acres. The total area that is disturbed is estimated to be 19.51 acres.

The volumes of individual waste piles at this site are as follows:

WP-1:	13,213 cu. yds.;	WP-2:	6,262 cu. yds.;
WP-3:	6,617 cu. yds.;	WP-4:	4,544 cu. yds.;
WP-5:	3,890 cu. yds.;	WP-6:	526 cu. yds.;

WP-7: 292 cu. yds.; WP-8: 2,178 cu. yds.;

Scattered - 1,740 cu. yds.

**Site Access:** Site access shall be through the use of route 6730 and taking the community landfill road. All the roads are unimproved and will require some improvements. Any existing roads that are used shall be returned to its original condition or better. Any ancillary roads that are created shall be taken out and scarified.

**Site Earth Work:** Earth work shall be in accordance with section 303.2B, Excavation and Backfilling sequence. Final lift shall be in accordance with section 303.03 fill requirements. The following is the sequence of work;

- a) Improve access to the site;
- b) Improve the access to the pit;
- c) Excavate spoil and place into the pit;
- d) Regrade disturbed areas to a slope of 5h:1v or less.

**402.08 Site NA-0138, BOYD TISI NO. 2**

**Location:** Site NA-0138 is located about 2.7 miles to the southeast of the junction of highway 89 and route 6730 on route 6730.

**Description:** This site features a shallow pit that has since been backfilled with sediment from a nearby wash. Around the pit are spoil piles that are very steep. Estimated spoil volume is 12,060 cubic yards with an estimated area of disturbance of 6 acres.

The volumes of individual waste piles at this site are as follows:

WP-1:	1,887 cu. yds.;	WP-2:	2,094 cu. yds.;
WP-3:	3,198 cu. yds.;	WP-4:	4,619 cu. yds.;
WP-5:	262 cu. yds.		

**Site Access:** Site access is along route 6730 about 2.7 miles along an unimproved dirt road. An ancillary road shall be made leading to the site with care for dust abatement as a house is nearby. Existing roads shall be returned to their original state after the project is completed. Ancillary roads that are created are to be removed by scarification with a ripper.

**Site Earth Work:** Earth work shall be in accordance with Section 303.02B, Excavation and Backfilling sequence. Final lift shall be in accordance with Section 303.03, Fill Requirements. The following is the sequence of work;

- a) Improve access to the site;

- b) Improve the access to the pit;
- c) Excavate the sediment filled pit and save for topsoiling;
- d) Excavate spoil and place into the pit;
- e) Regrade disturbed areas to a slope of 5h:1v or less.

**402.09 Site NA-0139, JUAN HORSE NO. 3**

**Location:** The site is located about 2.7 miles from the junction of highway 89 and route 6730 next to site NA-0138.

**Description:** This site features an open pit with vertical highwalls with associated spoil piles around the perimeter of the pit which have an estimated volume of 63,427 cubic yards. The spoil covers an estimated area of 9.68 acres. The total disturbed area is estimated to cover 18.16 acres.

The volumes of individual waste piles at this site are as follows:

WP-1:	31,545 cu. yds.;	WP-2:	8,112 cu. yds.;
WP-3:	6,093 cu. yds.;	WP-4:	17,308 cu. yds.;
WP-5:	308 cu. yds.;	WP-6:	61 cu. yds.

**Site Access:** The site is accessed along route 6730, an unimproved dirt road approximately 2.7 miles. An ancillary road shall be created around a housing settlement that is to the west of the site. Great care must be exercised in dust abatement when working in this area. Existing roads are to be returned to as close to their original condition as possible. Any ancillary roads must be removed by means of scarification through a ripper.

**Site Earth Work:** Earth work shall be accordance with Section 303.02B, Excavation and Backfilling Sequence. Final lift shall be in Accordance with Section 303.03 Fill Requirements. The following is the sequence of work;

- a) Improve access to the site;
- b) Improve the access to the pit;
- c) Excavate spoil and place into the pit;
- d) Regrade disturbed areas to slopes of 5h:1v or less.

**402.10 Site NA-0149a, CHARLES HUSKON NO. 3**

**Location:** The site is located about 3.8 miles from a turnoff from highway 89 at mile post marker 461.90 along an unimproved dirt road.

**Description:** This site features four (4) pits with steep highwalls and with spoiling into a drainage that leads into the Little Colo-

rado River. Estimated volume of spoil is 55,097 cubic yards covering about 4.79 acres. Total area of disturbance is estimated to cover 15.37 acres.

The volumes of individual waste piles at this site are as follows:

WP-1:	9,775 cu. yds.;	WP-2:	15,423 cu. yds.;
WP-3:	4,137 cu. yds.;	WP-4:	25,751 cu. yds.;
Scattered - 11 cu. yds.			

**Site Access:** The site shall be accessed by an unimproved dirt road by getting off highway 89 at mile post marker 461.90. This existing road may have to be improved leading up to the site. Ancillary roads may have to be made leading to the site. At the end of the project the existing roads shall be returned to as close to original condition as possible. Any ancillary roads shall be taken out by means of a ripper.

**Site Earth Work:** Earth work shall be in accordance with Section 303.02B, Excavation and Backfilling Sequence. Final lift shall be in accordance with Section 303.03 Fill Requirements. The following is the sequence of work;

- a) Improve access to the site;
- b) Improve the access to the pit;
- c) Excavate spoil and place into the pit;
- d) Construct terraces on the reclaimed pit and ensure positive drainage.
- e) Regrade the disturbed areas to a slope of 3h:1v or less.

#### 402.11 Site NA-149b, CHARLES HUSKON NO. 3

**Location:** This site is located about 4 miles east of highway 89 taking the exit at highway marker 461.90.

**Description:** The site feature is an shallow pit on the talus slope of a hill. About the pit are spoil piles with an estimated volume of 8,420 cubic yards covering an area of 1.69 acres. Estimated area of total disturbance is about 5.39 acres.

The volumes of individual waste piles at this site are as follows:

WP-1:	3,520 cu. yds.;	WP-2:	4,081 cu. yds.;
WP-3:	649 cu. yds.;	WP-4:	134 cu. yds.;
Scattered - 36 cu. yds.			

**Site Access:** Access shall be at mile marker 461.90 along highway 89 to the east on existing unimproved dirt roads. The dirt roads may have to be improved and near the site ancillary road may have to be built. All existing roads when the project is completed are to be restored to as close to original condition as possible. Created ancillary roads are to be removed by means of a ripper.

**Site Earth Work:** Earth work shall be in accordance with Section 303.02B, Excavation and Backfilling Sequence. Final lift shall be in Accordance with Section 303.03 Fill Requirements. The following is the sequence of work;

- a) Improve access to the site;
- b) Improve the access to the pit;
- c) Excavate spoil and place into the pit;
- d) Regrade disturbed areas to slopes of 3h:1v or less.

**402.12 Site NA-0149c, CHARLES HUSKON NO. 3**

**Location:** The site is about 4 miles to the east from highway 89 off highway marker 461.90 along unimproved dirt roads.

**Description:** The site consists of one open shallow pit with spoil about the pit perimeter. The site also has natural drainage going through the site. The estimated spoil volume is 2,872 cubic yards covering an area of 1.45 acres. The total disturbance area covers about 3.96 acres.

The volumes of individual waste piles at this site are as follows:

WP-1:	935 cu. yds.	WP-2:	163 cu. yds.
WP-3:	1,423 cu. yds.;	WP-4:	329 cu. yds.
WP-5:	22 cu. yds.		

**Site Access:** Access will be along an unimproved dirt road coming off highway 89 at highway marker 461.90. The existing dirt road may have to be improved and near the site ancillary roads may have to be created. After completion of the project all existing roads shall be returned to as close to their original condition or better. Any ancillary roads that are created are to be removed by means of a ripper.

**Site Earth Work:** Earth work shall be in accordance with Section 303.02B, Excavation and Backfilling Sequence. Final lift shall be in Accordance with Section 303.03 Fill Requirements. The following is the sequence of work;

- a) Improve access to the site;
- b) Improve the access to the pit;

- c) Excavate spoil and place into the pit;
- d) Regrade disturbed areas to a slope of 4h:1v or less.

**402.13 Site NA-0159d, CHARLES HUSKON NO. 3**

**Location:** This site is located about 4.4 miles to the east of highway marker 461.90 along highway 89 along a dirt road.

**Description:** The site features are an open pit and associated rim strip along an isolated hill near the Little Colorado River. There are very steep highwalls which need to be addressed by backfilling with the spoil that is estimated at a volume of 200,901 cubic yards. The total area that the spoil covers is about 23.89 acres. There is about 1,125 ft of highwalls to address at this site.

The following is a rough estimate of the breakdown of the total volume into the individual volumes of the wastepiles WP-1 through WP-9, as shown on the map:

WP-1:	62,800 cu. yds.	WP-2:	54,400 cu. yds.
WP-3:	9,200 cu. yds.	WP-4:	5,500 cu. yds.
WP-5:	21,100 cu. yds.	WP-6:	9,400 cu. yds.
WP-7:	800 cu. yds.	WP-8:	19,800 cu. yds.
WP-9:	15,800 cu. yds.	Scattered:	2,101 cu. yds.

**Site Access:** The site shall be accessed by way of a unimproved dirt road off highway 89 taking the turnoff at mile post 461.90. The existing road may have to be improved and an ancillary created to gain access to the site. After the project is finished, the existing roads shall be returned to as close to their original condition as possible. Any ancillary roads that are created are to be removed by means of a ripper.

**Site Earth Work:** Earth work shall be in accordance with Section 303.02B, Excavation and Backfilling Sequence. Final Lift shall be in accordance with Section 303.03 Fill Requirements. The following is the sequence of work;

- a) Improve access to the site;
- b) Improve the access to the pit;
- c) Excavate spoil and place into the pit;
- d) Regrade disturbed areas to a slope of 3h:1v or less.

**402.14 Site NA-0153, YAZZIE NO. 102**

**Location:** This site is located about 7.4 miles from highway marker

460.95 along highway 89 going east along a dirt road leading to the DOT gravel pit.

**Description:** This site features a rimstrip along an alluvium hillside with spoiling onto the downslope leading to the Little Colorado River. It is estimated that the volume of the spoil is 21,452 cubic yards covering about 5.04 acres. The total area of disturbance is estimated to be 10 acres.

The volumes of individual waste piles at this site are as follows:

WP-1:	10,657 cu. yds.;	WP-2:	492 cu. yds.;
WP-3:	6,655 cu. yds.;	WP-4:	2,091 cu. yds.;
WP-5:	1,557 cu. yds.		

**Site Access:** Access shall be by an easterly dirt road coming off highway 89 at highway marker 460.95 an access road leading to the DOT gravel pit. It is estimated that the site is 7.4 miles from highway 89. After construction is finished, all the existing roads that were used are to be returned to their original condition or better. Any ancillary roads created during construction to the site are to be removed by means of a ripper.

**Site Earth Work:** Earth work shall be in accordance with section 303.02B, Excavation and Backfilling Sequence. Final Lift shall be Accordance with Section 303.03 Fill Requirement. The following is the sequence of work;

- a) Improve the access to the site;
- b) Improve access to the downslope spoil;
- c) Excavate spoil and place into rimstrip and against the natural alluvium hillside to stabilize the base of the downslope;
- d) Regrade disturbed areas to slope of 3h:1v or less.

#### **402.15 Site NA-0154, YAZZIE NO. 102**

**Location:** The site is located about 7.2 miles to the east of highway 89 from highway marker 460.95.

**Description:** The site feature is an open pit with steep highwalls next to an existing road. The spoiling is to the east of the pit which is towards the downslope leading to the Little Colorado River. The estimated volume of the spoil (shown as WP-1 on the map) is 11,502 cubic yards which covers an area of about 1.55 acres. The total disturbed area is estimated to be 5.91 acres.

**Site Access:** Site access shall be along a dirt road coming off highway 89 from mile marker 460.95. This is the AZ DOT gravel road. It is estimated that the site is 7.2 miles from Highway 89. Access to the site shall be along existing roads. Ancillary roads

may have to be created to the site. All existing roads used during the work shall be returned to as close to their original condition. Any ancillary roads that are created are to be removed by means of a ripper.

**Site Earth Work:** Earth work shall be in accordance with Section 303.02B, Excavation and Backfilling Sequence. Final lift shall be in Accordance with Section 303.03 Fill Requirements. The following is the sequence of work;

- a) Improve access to the site;
- b) Improve the access to the pit;
- c) Excavate spoil and place into the pit;
- d) Regrade disturbed areas to a slope of 4h:1v or less.

**REPAIR OF LIVESTOCK PONDS AND A DIKE:**

The work includes cleaning up of the silt from the bottom of the three (3) livestock ponds, locations of which are shown on Map No. 32, and deepening the ponds. The work shall be done under the direction of the Project Coordinator or the Engineer. The excavated material shall be placed on the top of the existing dikes or stored nearby for future use as per the direction of NAMLRD. The total volume of earthwork for this Work item is approximately 14,400 cubic yards.

The only dike to be repaired is near site NA-0139, as shown on the Map. The details of work is shown on Map 32. Volume of earthwork is approximately 600 cubic yards. The contractor shall overexcavate the top 8 feet of the dike and the ground under the breached portion of the dike and rebuild the dike as per the direction of the Engineer or Project Coordinator. The fill material shall be free of voids, roots and other substances which cannot be classified as Engineering Fill. The fill shall be placed in layers, not exceeding 2 feet in thickness, and compacted by the weight of the heavy earth moving machineries (at least 5 passes). The compaction (at least 90% of Proctor density) and moisture conditioning of the fill material will be verified by NAMLRD personnel. Earthen buttress shall be placed against the rebuilt portion of the dike or at locations against the ibye side of the dike selected by the Engineer of the Project Coordinator.

**SECTION 0500  
MAPS AND DRAWINGS**

**INDEX OF MAPS**

MAP NO. 1	Cameron	AMLR Project 2 Location Map
MAP NO. 2	NA-0127	Project Map
MAP NO. 3	NA-0128a	Project Map
MAP NO. 4	NA-0128b	Project Map
MAP NO. 5	NA-0129	Project Map
MAP NO. 6	NA-0130	Project Map
MAP NO. 7	NA-0135	Project Map
MAP NO. 8	NA-0136	Project Map
MAP NO. 9	NA-0138	Project Map
MAP NO. 10	NA-0139	Project Map
MAP NO. 11	NA-0149a	Project Map
MAP NO. 12	NA-0149b	Project Map
MAP NO. 13	NA-0149c	Project Map
MAP NO. 14	NA-0149d	Project Map
MAP NO. 15	NA-0153	Project Map
MAP NO. 16	NA-0154	Project Map
MAP NO. 17	NA-0127	Post-Reclamation Map
MAP NO. 18	NA-0128a	Post-Reclamation Map
MAP NO. 19	NA-0128b	Post-Reclamation Map
MAP NO. 20	NA-0129	Post-Reclamation Map
MAP NO. 21	NA-0130	Post-Reclamation Map
MAP NO. 22	NA-0135	Post-Reclamation Map
MAP NO. 23	NA-0136	Post-Reclamation Map
MAP NO. 24	NA-0138	Post-Reclamation Map
MAP NO. 25	NA-0139	Post-Reclamation Map
MAP NO. 26	NA-0149a	Post-Reclamation Map
MAP NO. 27	NA-0149b	Post-Reclamation Map
MAP NO. 28	NA-0149c	Post-Reclamation Map
MAP NO. 30	NA-0153	Post-Reclamation Map
MAP NO. 31	NA-0154	Post-Reclamation Map
MAP NO. 32	Location of Ponds and Dike	

**INDEX OF DRAWINGS**

DRAWING NO. 1: Cross Section of Pit Showing Placement of Material.

NOTE: Maps and drawings are provided under separate cover.

## APPENDIX A

Pages 41-46 of results of a Paleontological field survey of abandoned uranium mine sites in Cameron, Arizona, by Patty Luttrell, Randy Kirby, and Michael Morales of Museum of Northern Arizona, dated March 30, 1993 are included in this appendix. Five (5) sites viz. NA-0127, NA-0128B, NA-0136, NA-0139, and NA-0154 will undergo paleontological salvage and/or monitoring work conducted by Museum of Northern Arizona. From past experience, it was learnt that their work has none to very minor effect on the construction activities or the productivity. However, the contractor must cooperate with the paleontologist and coordinate the construction activities in such a manner that will ensure least interference.

## APPENDIX A

Pages 41-46 of results of a paleontological field survey of abandoned uranium mine sites in Cameron, Arizona, by Patty Luttrell, Randy Kirby, and Michael Morales of Museum of Northern Arizona, dated March 30, 1993 are included in this appendix. Five sites viz. NA-0127, NA-0128B, NA-0136, NA-0139, and NA-0154 will undergo paleontological salvage and/or monitoring work conducted by Museum of Northern Arizona. From past experience it was learnt that their work has none to very minor effect on the construction activities or the productivity. However, the contractor must cooperate with the paleontologists and coordinate the construction activities in such a manner that will ensure least interference.

RECOMMENDATIONS FOR PROTECTION OF PALEONTOLOGIC  
RESOURCES DURING MINE RECLAMATION

Mitigation Criteria

Several criteria were used to determine potential impact on paleontologically significant localities, and to formulate recommendations for mitigation (Kirby et al., 1991). These include: 1) salvage prior to initiation of reclamation operations, 2) on-site monitoring during the course of reclamation activities, and 3) exclusion of sensitive sites or outcrops from the area impacted by reclamation operations. Recommendations for sites reviewed during the present survey are summarized below and in Table 1 at the end of this report.

Salvage is recommended if in-situ fossil specimens are of obvious scientific interest and if reclamation operations would result in the loss of important scientific information. In some cases, salvage can be conducted concurrent with reclamation operations, in conjunction with on-site monitoring. The fossil locality itself must also be appropriate for reasonable cost-effective salvage. If cost-effective salvage is not possible, it may be appropriate to recommend against salvage.

Monitoring is recommended if there is a reasonable basis to anticipate that significant material may be encountered during reclamation. This would generally have to be supported by information gathered during the field survey. Reclamation is anticipated to involve transfer of overburden and waste piles into the abandoned open pit mines, utilizing heavy equipment such as bulldozers and/or backhoes. It may

be appropriate to observe reclamation operations for fossil remains if waste piles or outcrops adjacent to a pit site have produced significant or abundant fossils.

Exclusion of a locality or outcrop from the proposed area of reclamation activities would be appropriate if a significant fossil locality or outcrops with a history of productivity occur within the impacted area, and should be left undisturbed for long term scientific study and evaluation. Such a determination is based on observation in the field during the survey, and research of available literature on the history of the localities and/or outcrops in question.

#### Mitigation Recommendations

Site NA-0127 The large waste pile at site 27 has produced fossil reptilian bone tentatively identifiable at the family level. Although the specimens are fragmentary and of low abundance on the waste surface, the rib from site 27 suggests that larger, perhaps identifiable elements, may remain inside the pile. The waste pile is therefore assigned a high paleontologic sensitivity, and monitoring is recommended during the course of reclamation activities.

Site NA-0128 a,b Small areas of the waste piles at site 28a have produced rare, non-diagnostic fragments of bone, of doubtful paleoecological utility. Reclamation activities would have a limited impact on paleontologic resources, and mitigation procedures are not recommended for site 28a.

Field observations indicate that useful specimens remain in at least one waste pile at site 28b, and that at least one waste pile overlies undisturbed outcrops that have produced abundant and diverse identifiable bone and coprolites. The presence of small intact elements in association with dense concentrations of coprolites indicates that a significant microvertebrate sample might be obtained from this site. The proximity of the most sensitive areas of these strata to waste accumulation intended for reclamation action places them at high risk of destruction. Salvage of these strata is recommended prior to reclamation, and monitoring of the most sensitive waste areas is recommended during reclamation.

Site NA-0129 Site 29 contains a single large in-situ log of doubtful taxonomic or paleoecological value. The position of the specimen on a high point of undisturbed outcrop free of waste rock places it at low risk of negative impact during reclamation. No other fossils were encountered in the pit or waste piles. No mitigation is recommended.

Site NA-0130 Site 30 produced no fossil specimens of any kind, although important taxa have been reported from outcrops close to the site. Exclusion of surrounding undisturbed outcrops from reclamation impacts is recommended.

Site NA-0135 Mixed waste and overburden accumulations on the northern and eastern margins of site 35 produced a small collection of non-

diagnostic bone fragments of doubtful provenance; poorly preserved plant impressions are also non-diagnostic. In view of the limited taxonomic and paleoecologic value of these occurrences, mitigation is not recommended for site 35.

**Site NA-0136** A single waste pile on the northern perimeter of site 36 has produced a collection of identifiable vertebrate specimens of low abundance. However, these specimens are mixed overburden probably sourced from a fossiliferous horizon close to the surface and buried beneath waste piles at the site margin. This horizon has produced a diverse collection of comparatively well preserved elements, and reclamation activities are at high risk of exposing additional material. Monitoring during reclamation procedures is recommended.

**Site NA-0138** No fossils of any kind were recovered from the waste piles at site 38, and provenance of existing pit debris is questionable due to extensive fill by alluvium from Tanner Wash. Mitigation is not recommended.

**Site NA-0139** A partial vertebrate skull in-situ in a sandstone block has been left in place for future recovery in the overburden pile on the northern rim of site 39. Additional portions of this specimen may also reside in the the overburden pile. Salvage prior to reclamation action is recommended to retrieve the existing material. If the overburden is at risk of reclamation impact, monitoring is recommended in order to retrieve possible buried material.

Site NA-0149 a,b,c,d No significant specimens occurred in the limited paleontologic sample collected site at 49a. Although several large in-situ logs are at risk of dismemberment or burial during reclamation operations at sites 49 b,c,d, collection and storage of such specimens would be cost-prohibitive, and mitigation is not recommended.

Site NA-0153 A small collection of non-diagnostic elements was made from the surface of the large waste pile at site 53. More abundant material was collected from in-situ outcrops several tens of feet north of the pile, which may have partly sourced the occurrences in the waste rock. However, the distance of these outcrops from sites of potential reclamation impact, and the restricted nature of the material collected, suggest that minimal risk to paleontologic resources exists at this site. Mitigation is not recommended.

Site NA-0154 An unidentified element occurs in-situ in the pit wall at site 54. Salvage is recommended for the retrieval and identification of the in-situ specimen.

TABLE 1: SUMMARY OF RECOMMENDED MITIGATION

<u>SITE</u>	<u>SALVAGE</u>	<u>MONITORING</u>	<u>EXCLUSION</u>	<u>NO MITIGATION</u>
NA-0127	-	Yes	-	-
NA-0128a	-	-	-	Yes
28b	Yes	Yes	-	-
NA-0129	-	-	-	Yes
NA-0130	-	-	Yes	-
NA-0135	-	-	-	Yes
NA-0136	-	Yes	-	-
NA-0138	-	-	-	Yes
NA-0139	Yes	Yes	-	-
NA-0149a	-	-	-	Yes
49b	-	-	-	Yes
49c	-	-	-	Yes
49d	-	-	-	Yes
NA-0153	-	-	-	Yes
NA-0154	Yes	-	-	-